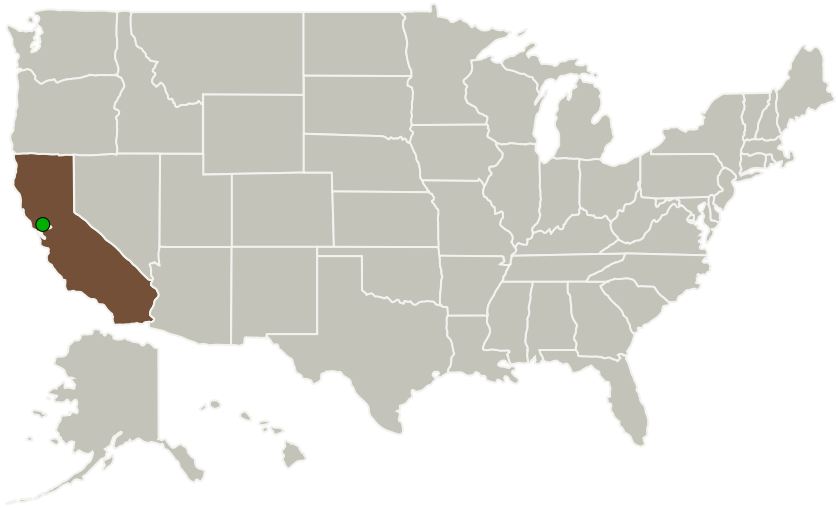
Hybrid-Electric and All-Electric Rotorcraft Analysis and Tool Development, Phase I

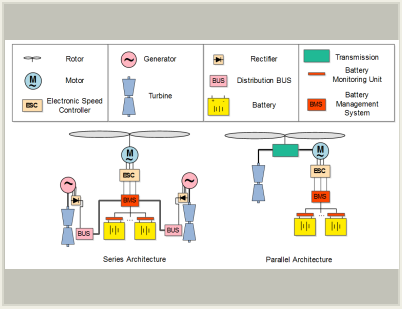
Completed Technology Project (2014 - 2014)

Project Introduction

During this Phase I effort ESAero will draw upon its knowledge of hybrid-electric propulsion system design and analysis for fixed wing aircraft to investigate the potential benefits of incorporating such systems into rotorcraft designs. Past rotorcraft studies have been conducted in conjunction with Electricore, Inc. and an industry prime, to develop hybrid propulsion system trade studies and develop databases for hybrid propulsion system worthy components. This knowledge will be leveraged to investigate potential areas of improvement including energy consumption, weight, overall efficiency, and safety. Implementing hybrid-electric systems could potentially remove redundant systems, reduce turbine size and allow for electrically powered emergency decent. In addition, decoupled energy management has shown potential benefits for fixed wing aircraft, allowing propulsors to be placed virtually anywhere around the aircraft. The potential benefit specific to rotorcraft may mean a broadening of configuration possibilities.

Primary U.S. Work Locations and Key Partners





Hybrid-Electric and All-Electric Rotorcraft Analysis and Tool Development Project Image

Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

Hybrid-Electric and All-Electric Rotorcraft Analysis and Tool Development, Phase I

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Organizations Performing Work	Role	Type	Location
Empirical Systems Aerospace, Inc.(ESAero)	Lead Organization	Industry	Pismo Beach, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Transitions

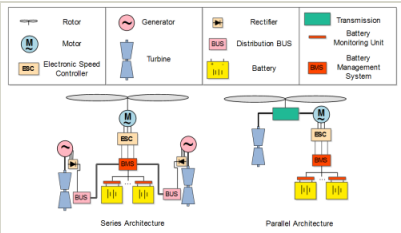
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140725)*

Images



Project Image
Hybrid-Electric and All-Electric Rotorcraft Analysis and Tool Development Project Image *(https://techport.nasa.gov/image/130216)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Empirical Systems Aerospace, Inc. (ESAero)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

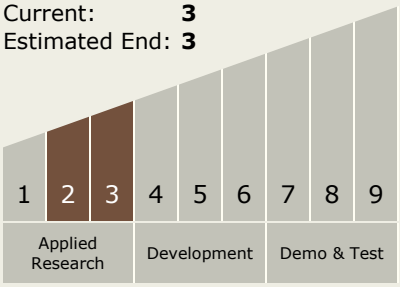
Carlos Torrez

Principal Investigator:

Michael W Green

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.1 Software Development, Engineering, and Integrity
    - TX11.1.8 Software Analysis and Design Tools

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System